Who Gets the Job? Who Keeps the Job?
An Analysis of the Relationship between Applicants' Performance on the AppliTrack Pre-Screening Tool and the Likelihood of their Hiring and Retention in One School District

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ABSTRACT

This study asks if there is a correlation between the work-related characteristics and skills measured in applicants by the AppliTrack pre-screening instrument and teacher hiring and retention. It contends that there are identifiable work-related characteristics and skills that do equate to being hired as a teacher. It further finds that there are identifiable work-related characteristics and skills that correlate with a teacher's retention. It considers pre-screening data from the Shawnee Mission School District and whether teachers hired after completing the pre-screener are still employed with the district. It also considers whether teachers who did leave the district did so voluntarily or involuntarily. This study seeks to address gaps in existing research by identifying a correlation between work-related characteristics and skills measured by a pre-screening instrument and teacher hiring and retention.

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CHAPTER 1

INTRODUCTION

1.1 Overview

Society's expectations for public schools will continue to change, as will the characteristics and skills of the teachers being asked to meet those expectations. Thus, using every available means of identifying, hiring and retaining high quality teachers is especially important. This study evaluates data from 6,117 teaching applicants who completed the AppliTrack pre-screening instrument in the Shawnee Mission School District between January 2010 and May 2015. Further tests are conducted on 414 applicants subsequently hired as teachers by the district. In so doing, this study seeks to identify a correlation between work-related characteristics and skills measured by the AppliTrack pre-screening instrument and teacher hiring and retention.

For the better part of the 20th Century, there has been conflict among educators, public officials, researchers, parents, and students about what constitutes a successful school. From progressive educational ideas focusing on the personal and social development of students, through traditional programs geared toward achieving individual excellence and an increasing respect for school authority, notions of what constitutes success have changed as our own lives have changed (Cuban, 2003). However, one aspect of education has consistently remained part of the discussion, the teacher. More than two decades of research findings are unequivocal about the connection between teacher quality and student learning. Indeed, *What Matters Most: Teaching for America's Future (1996)*, the influential report by the National Commission on Teaching and America's Future, stated clearly that what teachers know and can do is the most important influence on what students learn (pg. 10).

According to Wright, Horn, and Sanders (1997), students placed with highly effective teachers for three consecutive years, beginning in third grade, scored 52 percentile points higher on standardized tests than students with similar achievement histories that were in classrooms with low-performing teachers for three years consecutively. Researchers noted the following:

> The results of this study will document that the most important factor affecting student learning is the teacher. In addition, the results show wide variation in effectiveness among teachers. The immediate and clear implication of this finding is that seemingly more can be done to improve education by improving the effectiveness of teachers than by any other single factor. Effective teachers appear to be effective with students of all achievement levels regardless of the levels of heterogeneity in their classes. If the teacher is ineffective, students under that teacher's tutelage will achieve inadequate progress academically, regardless of how similar or different they are regarding their academic achievement (p. 63).

A 1997 study conducted by Sanders and Horn reveals a 39 percentage-point difference in student achievement between students with "most effective" and "least effective" teachers. In classrooms headed by teachers characterized as most effective, students posted achievement gains of 53 percentage points over the course of one academic year, whereas in classrooms led by least effective teachers; student achievement gains averaged 14 percentage points (Marzano, 2003). Thus, while the definition of what constitutes a successful school may change, the role and importance of the teacher remains.

Not surprisingly, as school districts endeavor to solicit, hire and retain high-quality, effective teachers, the practices associated with pre-screening and hiring have changed as well.

This study looks at one district's use of the AppliTrack pre-screening instrument and seeks to identify a relationship between work-related characteristics and skills measured by a pre-screening instrument and teacher hiring and retention.

1.2 Purpose of this Study

The purpose of this study is to address gaps in existing research by identifying a relationship between work-related characteristics and skills measured by the AppliTrack pre-screening instrument and teacher hiring and retention. Existing studies have looked at the relationship between work related characteristics and teacher quality (Hughes, 2012). Others have researched teacher turnover in relation to contextual factors: money, organization, or culture (Ingersoll, 2001). This study looks at one district's use of the AppliTrack pre-screening instrument and seeks to identify a relationship between work-related characteristics and skills measured by a pre-screening instrument and teacher hiring and retention.

1.3 Significance of this Study

In October of 2002, the United States Department of Education hosted the Student Achievement and School Accountability conference to promote the No Child Left Behind Act. The goal of the conference was to provide states and school districts with information and tools needed to implement NCLB. A significant part of the conference focused on what it meant to be a highly qualified teacher in the United States. The United States Department of Education (2002) defined a Highly Qualified teacher as one who "(a) holds a minimum of a bachelor's degree, (b) has obtained full state certification or licensure, and (c) has demonstrated subject area competence in each of the academic subjects in which the teacher teaches" (p. 3). Extolling the

virtues of highly qualified teachers continues to be a focus of the United States Department of Education in their ongoing efforts to improve student achievement. Thus, as teachers are held to higher expectations with regard to district accreditation and student achievement, the importance of identifying and hiring high-quality teachers becomes that much more imperative; moreover, once hired, retaining these teachers is equally significant.

The U.S. Department of Education (2011) estimates that over one million teachers were hired between 2012 and 2014, with over a half-million hired in 2014 alone (Rose, 2014). Hiring Highly Qualified teachers is the most important task of any district. Not surprisingly, failing to hire Highly Qualified teachers can render both tangible and intangible consequences. Ineffectual hires potentially damage programs; diverting salary, benefits, training, and supervision time to ineffective instruction. On the other hand, an effectual hire is more than just a quality employee. Quality hires can foster student recruitment, enthusiasm and retention. With the extreme cost of hiring permanent teachers and limited district resources, hiring the right person at the right time is a challenge for districts, regardless of their size. School districts and building administrators must recruit and hire teacher candidates with the right academic qualifications, while at the same time keeping an eye on accountability, academic achievement and retention.

Teacher turnover, migrating to another school or leaving the teaching profession altogether, cannot be explained only by retirement and increased student enrollments (Ingersoll, 2001). Estimates of teacher attrition range from 20% to 50% of teachers leaving the profession within the first five years, with 40% to 50% of beginning teachers leaving the profession after just five years. (Ingersoll & Smith, 2003; Hughes, 2012; Ingersoll & Merrill, 2010). The loss of inexperienced and experienced teachers results in a combined turnover rate of approximately 13%-15% per year (Ingersoll, 2001). The annual financial costs of recruiting, hiring, and

training new teachers is staggering, with estimates of a total national replacement cost of $2.2 billion per year (Hughes, 2012).

Interestingly, a teacher's own academic achievement plays a role in the length of time they stay in the profession. Guarino et al. (2004) found that teachers with higher measured ability have a higher probability of leaving. A teacher's ACT score also plays a role in retention, with those having higher scores less likely to remain in teaching (Hughes, 2012). Still, the main reasons teachers leave the profession stay consistent from year to year: personal and family considerations, other career opportunities, salary, administrative support, and overall job satisfaction (Riggs, 2013; Brownell et al, 2010; Miller, Brownell & Smith, 1999; Inman & Marlow, 2004).

In order to reduce costs (financial and otherwise) associated with teacher attrition, many school districts are starting to utilize online, pre-screening instruments as part of the hiring process. This study looks at one district's use of the AppliTrack pre-screening instrument and seeks to identify a relationship between the work-related characteristics and skills measured during the pre-screening process and teacher hiring and retention.

1.4 Research Questions to be Answered

This study focuses on two main research questions:

1. Is there a relationship between work-related characteristics and skills measured by the AppliTrack pre-screening instrument and teacher hiring and retention?
2. Which work-related characteristic(s) or skill(s) measured by the AppliTrack pre-screening instrument demonstrate a relationship with teacher hiring and retention?

1.5 Summary

Today, school districts want high-quality teachers who are not only prepared academically, but who also have the work-related characteristics and skills associated with high student achievement *and* longevity in the classroom. This study evaluates data from 6,117 teaching applicants who completed the AppliTrack pre-screening instrument in the Shawnee Mission School District between January 2010 and May 2015. Further tests are conducted on 414 applicants subsequently hired as teachers by the district. In so doing, this study seeks to identify a correlation between work-related characteristics and skills measured by the AppliTrack pre-screening instrument and teacher hiring and retention.

CHAPTER 2

REVIEW OF LITERATURE

2.1 Introduction to the Literature

Few studies have considered a connection between the work-related characteristics and skills identified in applicants during the pre-screening process and teacher hiring and retention. Existing studies have looked at the relationship between work related characteristics and teacher quality (Hughes, 2012). Others have researched teacher turnover in relation to contextual factors: money, organization, or culture (Ingersoll, 2001). The purpose of this study is to address gaps in existing research by identifying a relationship between work-related characteristics and skills measured by the AppliTrack pre-screening instrument and teacher hiring and retention.

This review is broken into eight sections: *The Importance of Hiring and Retaining Quality Teachers, Why Teachers Leave the Profession, Why Teachers Stay in the Profession, The Importance of Work-Related Characteristics and Skills, The Emergence of Pre-Screening Instruments, Modern Pre-Screening, The Importance of Job-Fit,* and *AppliTrack.* The *AppliTrack* section contains *AppliTrack Measured Characteristics, AppliTrack Questions, AppliTrack Adverse Impact Results*, and *AppliTrack Validity*. This review also references Appendix A, a *Candidate Summary Report* used to evaluate applicant's responses, Appendix B, an *Interview Report* that can be used if the applicant is moved to a face-to-face interview, and Appendix C *AppliTrack Sample Questions*.

This review draws from existing research and offers new insight into the relevance and use of online pre-screening instruments and the work-related characteristics and skills they measure. It considers one district's use of the AppliTrack pre-screening instrument and seeks to

identify a relationship between work-related characteristics and skills measured by a pre-screening instrument and teacher hiring and retention.

2.2 The Importance of Hiring and Retaining Quality Teachers

With continued expectations and pressure from federal and state mandates, school districts must recruit and hire high-quality teachers with the right qualifications; but it is equally important that they choose candidates who will stay in the profession. Teacher turnover refers to major changes in a teacher's assignment from one school year to the next. Turnover includes three components, the most studied of which are leaving teaching employment (commonly referred to as attrition) and moving to a different school (commonly referred to as migration) (Boe, Cook, & Sunderland, 2008). Ingersoll and Merrill (2010) found that teaching has more annual turnover than some higher-status professions (such as lawyers, engineers, architects, professors, and pharmacists); about the same turnover as some occupations (such as police officers and corrections officers); and less turnover than some lower-status lines of work (such as child care workers, secretaries, and paralegals).

Estimates of teacher attrition range from 20 percent to 50 percent of teachers leaving the profession within the first five years (Hughes, 2012; Ingersoll & Merrill, 2010). Sadly, schools and classrooms with at-risk populations are often most affected by teacher turnover. The turnover rate is about 50 percent higher in high-poverty schools as compared to more affluent ones, and tends to be higher in urban and lower-performing schools. In fact, data shows that in 2004-2005, 45 percent of all public school teacher turnovers took place in just one-fourth of public schools (Hughes, 2012; Ronfeldt, Loeb, & Wyckoff, 2013; Hanushek, Kain & Rivkin, 1999). In *Teacher Turnover: Examining Exit Attrition, Teaching Area Transfer, and School*

Migration, researchers found that "four out of every ten entering special education have left before their fifth year—a 4-year rate of 40%" (Boe, Cook, & Sunderland, 2008). Half of all teachers in the top 20 percent of effectiveness leave within five years (TNTP, 2012). The loss of inexperienced and experienced teachers results in a combined turnover rate of approximately 13%-15% per year (Ingersoll, 2001).

The annual financial costs of recruiting, hiring, and training new teachers is staggering, with estimates of a total national replacement cost of $2.2 billion per year (Hughes, 2012). A study conducted by the National Committee on Teaching and America's Future (2007) found that when a teacher leaves, the costs of recruiting, hiring and training a replacement teacher are substantial. In a pilot study of teacher turnover conducted in five school districts, the cost per teacher leaver ranged from $4,366 to $17,872 (pg. 3). Failure to retain quality teachers not only costs our school systems billions of dollars and causes staffing problems, but also negatively affects the school environment and student achievement.

Research confirms that teachers can have a profound effect on student outcomes. Empirical estimates find that a one standard deviation increase in teacher effectiveness raises student test achievement by 0.10 to 0.25 standard deviations, and that teachers can affect long-term student outcomes, such as college-going behavior and labor market earnings (Coggins & Diffenbaugh, 2013; Goldhaber, Grout & Huntington-Klein, 2014). According to Marzano (2003), elementary age students taught by ineffective teachers for several years in a row scored significantly lower on standardized tests than students taught by highly effective teachers. Further, Marzano (2003) found that students with an ineffective teacher for several consecutive years had decreased chances to maintain or advance their scores on standardized tests.

Not surprisingly, hiring an ineffective or short-term teacher can render both tangible and intangible consequences. Ronfeldt, Lankford, Loeb, & Wyckoff (2013) found that students in grade levels with higher turnover score lower in both English Language Arts and math and that these effects are particularly strong in schools with more low-performing and black students. Moreover, the results suggest that there is a disruptive effect from turnover beyond changing the distribution in teacher quality. An ineffective or short-term teacher can potentially damage programs; diverting salary, benefits, training and supervision time to ineffective instruction. The school's reputation may be negatively affected, both among students' friends and family, the community, and with industry and business stakeholders. On the other hand, an effective, steadfast teacher is more than just a quality employee. An effective teacher can foster student, family and community enthusiasm and involvement (Jordan, Dechert, & Wainwright, 2012). When a teacher is hired, districts are making what may turn out to be a long-term financial commitment. Thus, it is sensible to make sure the recruitment and selection process is effective and works well (Goldhaber, Grout & Huntington-Klein, 2014).

In 2009, Hopkins examined what qualities principals look for when hiring new teachers. He identified five fundamental qualities: 1) Passion, 2) Enthusiasm, 3) Sensitivity and Compassion for others, 4) A big heart for kids and a caring attitude, and 5) A good sense of humor (Hopkins, 2012). Moreover, research from Sanders and Rivers (1996) found that a teacher with certain characteristics could enhance student academic achievement. While research indicates there is no foolproof method to identifying who will make a quality teacher, recent reports from school human resource officers contend that being deliberate and strategic about hiring teachers reinforces the value placed on high quality teachers (Metzger & Wu, 2008). Previously, teachers were rated according to their academic success, interviewing skills, and

professional experience; now, in addition to these traditional qualities, school districts are also rating teachers on work-related characteristics and skills measured during the pre-screening process.

2.3 Why Teachers Leave the Profession

According to Ingersoll (2001), school staffing problems are not primarily due to teacher shortages, in the technical sense of an insufficient supply of qualified teachers. Rather, research indicates that school staffing problems are primarily due to excess demand resulting from a "revolving door" where large numbers of qualified teachers depart their jobs for reasons other than retirement. According to Ingersoll & Merrill (2010), the main causes of teacher departure are 1) inadequate support from the school administration, 2) student discipline problems, 3) limited faculty input into school decision making, and, to a lesser extent, 4) low salaries. Interestingly, teachers from top colleges, the most selective colleges and universities, are more likely to drop out of teaching. Similarly, Guarino et al. (2004) found that the preponderance of evidence suggests that teachers with higher measured ability have a higher probability of leaving.

Empirical research has focused on determining which kinds of teachers are more prone to leave teaching and why, instead of studying those who choose to stay. Ingersoll (2001) indicates that a teacher's field or discipline are strongly related to turnover, with special education, mathematics and science typically those having the highest turnover. Another important factor in a teacher's decision about whether to stay or leave the teaching profession is his/her age. Researchers have consistently found that younger teachers have very high rates of departure (Ingersoll, 2001). A study from the National Center for Education Statistics (Goldring, Tale & Riddles, 2014), found that in the 2012-13 school year, only 12 percent of the nation's 3.4 million

public school teachers (that includes public charter schools) had less than four years of teaching experience (pg. A-2). However, the main reasons for beginning teachers leaving the profession and teacher dissatisfaction stay consistent from year to year (Ingersoll, 2001):

Table 1. Reasons Beginning Teachers Leave the Profession

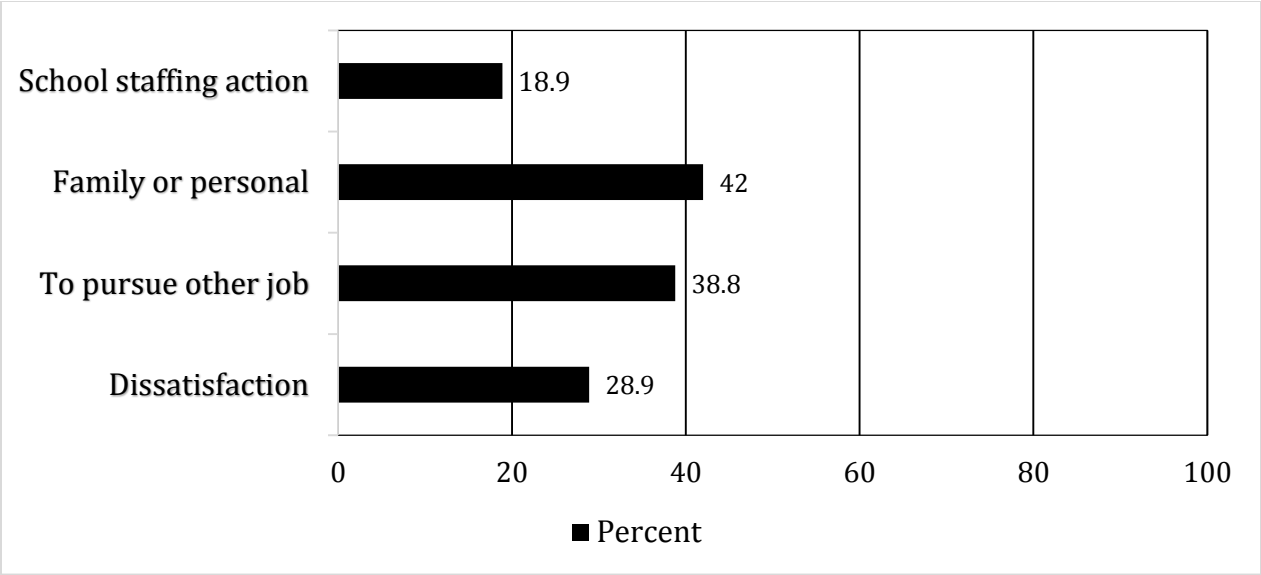
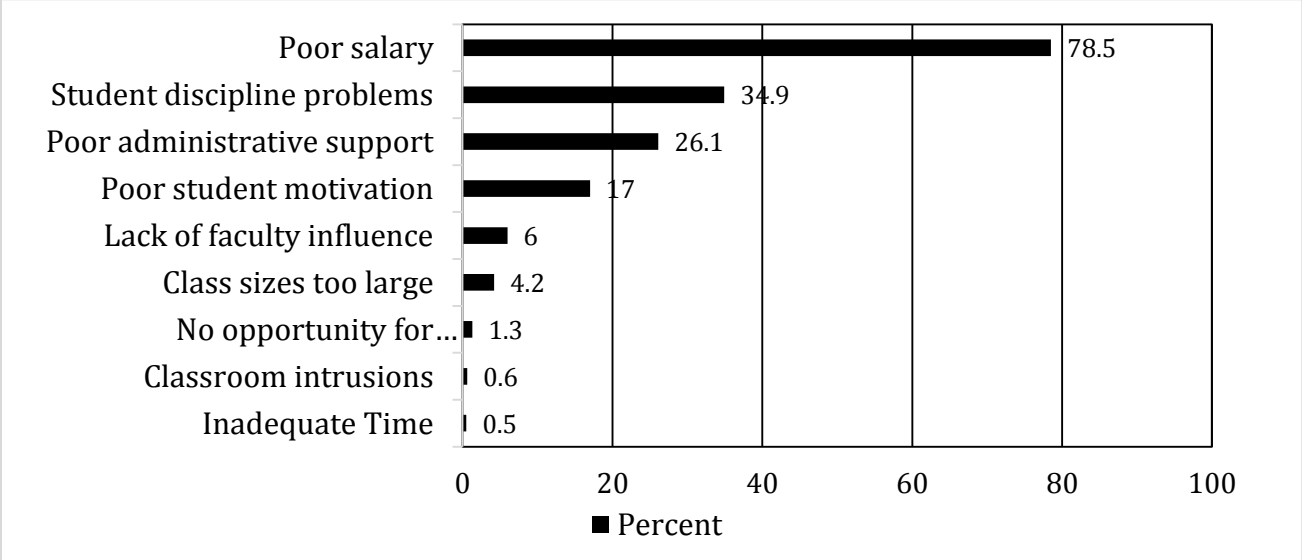


Table 2. Reasons Beginning Teachers Who Leave are Dissatisfied



2.4 Why Teachers Stay in the Profession

Research has long documented that teachers pursue a career in education largely to influence the lives of students (Coggins & Diffenbaugh, 2013). Pursuing teaching as a way to have a positive effect on individuals and society is especially apparent in the new generation of teachers (those with fewer than 10 years of experience) who now make up the majority of U.S. teachers. Second stage teachers, those with 3-10 years experience, chose teaching not only for their love of working with students, but also because of their commitment to social justice and their belief that teaching can improve society on a broader scale (Coggins & Diffenbaugh, 2013).

Overwhelmingly, teachers say they chose the teaching profession to make a difference in children's lives, followed closely by a desire to share their love of learning and teaching and to help students reach their full potential. Together, these findings show that most teachers enter the profession to make an impact on the world by educating students. The most-cited reasons for becoming a teacher display a commitment to and a passion for the profession. Teachers are far less likely to report becoming a teacher for reasons not connected to students, such as summers off. Nearly all teachers (99%) see their roles extending beyond academics to include things like reinforcing good citizenship, building resilience and developing social skills (Scholastic, 2015).

A growing body of evidence indicates that once they are employed and in the classroom, more effective teachers are at least as likely and sometimes more likely to stay in schools than their less effective peers. Further, teachers who produce higher achievement gains and those with more experience are least likely to apply for a transfer (Ronfeldt, et al., 2013). Several studies have also considered the role self-efficacy plays in a teacher's willingness and ability to stay in the profession: "a teachers' sense of efficacy may significantly influence classroom interactions, and ultimately, teacher stress, burnout, and intent to quit" (Skaalvik and Skaalvik,

2007). Bandura (1997) posited that educators with low self-efficacy tend to consider their surroundings as dangerous, focus on their coping deficits, and amplify the seriousness of potential risk. Teacher efficacy has also been linked to teacher strain and burnout, which is related to the likelihood that educators will persist in the classroom (Skaalvik and Skaalvik, 2007). Still, teacher efficacy does not exist in isolation and is influenced by a variety of factors, including student responsiveness. This ultimately affects job satisfaction and the potential for turnover (Mottet, et al., 2004).

Challenges aside, one study found that nearly 9 out of 10 teachers (88%) agree that the rewards of teaching outweigh the challenges—a finding that remains consistent across subjects taught, median household income of the school community, and the age of the teacher. It's not just that the rewards of teaching outweigh the challenges; a majority of teachers feel gratified by their careers, with a full 89% saying they are either satisfied (51%) or very satisfied (38%). Further, when teachers believe their voices are heard, they are more likely to be satisfied in their jobs. Specifically, those who feel the views of teachers like them are heard and valued at the district, state or national level are more likely to be very satisfied in their jobs than are those who feel teachers' views are valued at the school level only (Scholastic, 2014).

Finally, Robertson-Kraft & Duckworth (2015) conducted a study on the predictive validity of personal qualities not typically collected by school districts during the hiring process. Research considered how a teacher's *grit*, a disposition toward perseverance and a passion for long-term goals, explained variance in novice teachers' effectiveness and retention. Results showed that grittier teachers were more likely to complete the school year and also outperformed their less gritty colleagues, a conclusion that supports their assertion that "the work-related

characteristics and skills of the teacher is a significant variable. Indeed, some would argue it is the most significant variable" (p. 506).

2.5 The Importance of Work-Related Characteristics and Skills

Hiring the best instructor for a teaching position requires looking beyond the surface-level characteristics and experiences generally presented in a resume. Indeed, there are more than a few reasons for attributing such enormous importance to the work-related characteristics and skill traits of a teacher candidate. Research confirms that the characteristics of the teacher influence his/her association with pupils (Arif, et al., 2012). According to Dickson and Wiersma (1984) and Gibney and Wiersma (1986) (qtd. In Arif, et al., 2012):

> There is ample evidence supporting the view that work-related characteristics and skills of a teacher are important determiners of successful teaching, and that teacher effectiveness is perceived to exist as a consequence of the characteristics of a teacher as a person (pg. 163).

Several studies have found that many of the variables associated with effective teaching are non-academic in nature (Getzels & Jackson, 1963; Baldwin, et al., 1990). In fact, Pittman (1985) found that student ratings of teacher effectiveness were highly correlated to the work-related characteristics and skills dimensions of warmth, creativity, and organization. Similarly, Arif, et al. (2012) found that:

> Work-related characteristics and skills influence the behavior of the teacher in diverse ways, such as in interaction with students, teaching methods selected, and learning experiences chosen. The

> effective use of a teacher's work-related characteristics and skills is essential in conducting instructional activities. Students learn from a teacher's work-related characteristics and skills even if there is no formal interaction between student and teacher (pg. 163).

Researches show that learning in the classroom is an emotional experience and the younger the people the truer this statement becomes (Sehgal, 1955). According to Arif et al. (2012), the key to the satisfied, successful, and effective occupational and professional life is to have those characteristics and skills most suited to one's profession, job or occupation. As a novel and innovative profession, teaching demands certain work-related characteristics and skills. Those found most associated with teaching effectiveness are:

1) Conscientiousness: Dependable, hard-working, organized, self-disciplined, persistent, responsible
2) Emotional stability: Calm, secure, happy, unworried
3) Agreeableness: Co-operative, warm, caring, good-natured, courteous, trusting
4) Extraversion: Sociable, outgoing, talkative, assertive, gregarious
5) Openness to experience: Curious, intellectual, creative, cultured, artistic, sensitive, flexible, imaginative (Arif et al, 2012).

In 2009, Hopkins examined what qualities principals look for when hiring new teachers. He surmised five fundamental qualities: 1) passion, 2) enthusiasm, 3) sensitivity and compassion for others, 4) a big heart for kids and a caring attitude, and 5) a good sense of humor (Hopkins, 2012). Thompson et al. (2008) surveyed university students to determine the character traits of

quality teachers they noted from personal experiences. Their study found twelve characteristics of quality teachers: 1) fairness, 2) having a positive outlook, 3) being prepared, 4) using a personal touch, 5) possessing a sense of humor, 6) possessing creativity, 7) admitting mistakes, 8) being forgiving, 9) respecting students, 10) maintaining high expectations, 11) showing compassion, and 12) developing a sense of belonging for students.

Haberman (1995) also posited that a direct link existed between successful teaching and a teacher's character traits. He theorized that teacher candidates with suitable personal and interpersonal attributes would be quality teachers *and* remain in the teaching profession. According to Haberman (1995), it is more important to select teachers with the correct character traits than with the correct training. To that end, in the early and mid-1960s, Martin Haberman began to develop what would become the Haberman Star Teacher Interview system. By 2004, over 170 urban school districts were utilizing the Star Teacher Interview, which identified 16 highly sought characteristics typical in quality teachers. According to the Star Teacher model, quality teachers are: accepting, creative, loving, promoters of learning, competitive, caring, persistent, compassionate, knowledgeable, effective disciplinarians, enthusiastic, professional, empathetic, flexible, demanding, and goal oriented. Reed, Bergemann, Segall and Wilson (as cited in Minor, Onwuegbuzie, Witcher, & James, 2002) also found that certain key words commonly and accurately describe successful teachers, including knowledgeable, self-confident, and enthusiastic. Further, they found that successful teachers approach curriculum development and instruction innovatively. Such teachers resourcefully solve problems on a routine basis.

While research confirms that effective teachers certainly make a difference and that common characteristics and skills are regularly used to describe them, what is less clear is what specifically makes an effective teacher. In *The Essential Criteria for Hiring First Year Teacher*

Candidates, Ziebarth-Bovill et al. (2012) note that effective teaching cannot be reduced to technique; good teaching comes from the identity and integrity of the teacher. Getzels and Jackson (1963) supported this finding and added that effective teachers possess positive work-related characteristics, skills and interpersonal skills. In other words, a teacher's work-related characteristics and skills play a role in his or her effectiveness in the classroom.

2.6 The Emergence of Pre-Screening Instruments

Some argue that teacher selection is even more important than teacher evaluation in placing the best teachers in the classroom (O'Donovan, 2012); however, too often the process of teacher selection is left to chance as districts fail to align their expectations and their screening process in a systematic way. Traditional hiring involves long hours of reviewing résumés, screening and interviewing candidates, reference checks, demonstration lessons and writing samples, and sometimes final interviews with the superintendent. In many school districts, the Human Resource department hand-screens teacher candidates through the application process with a set of targeted standards. For example, school districts may select candidates by content knowledge, grade point average, paper pencil tests, or pedagogical preparation (O'Donovan, 2012).

Traditional screening and interviewing techniques intended to predict teaching effectiveness in terms of student achievement often fail to produce the desired result (Metzger & Wu, 2008). To address this, many school districts have turned to technology and online systems designed to assess teacher candidates beyond their academic records and work experience. Online pre-screening instruments, also known as commercial teacher selection instruments, "screen" the candidate pool to just those with designated, preferred work-related characteristics

and skills. The school district determines cut scores to establish the size of their pool based on identified needs, and online selection tools assist in narrowing an applicant pool to a manageable number of people worth considering in more detail (O'Donovan, 2012).

Pre-screening assessments are considered objective because all applicants are asked exactly the same questions and are evaluated exactly the same way. Moreover, pre-screening questions are designed to ensure fairness across Equal Employment Opportunity Commission (EEOC) classifications of race, gender, and age. Hence, while computerized pre-screening instruments do not replace personal interviews, by efficiently identifying candidates with work-related characteristics and skills best aligned with job and cultural fit, district representatives are able to spend more time with promising candidates and conduct more productive, personal interviews (Gallup Online, 2015).

2.7 Modern Pre-Screening

With research supporting the idea that hiring teachers with certain work-related characteristics and skills can enhance student academic achievement, accurately predict potential employee performance, and help administrators screen and hire the most qualified employees, the use of online pre-screeners has grown exponentially. For over 30 years, the most prominent commercial instrument for pre-screening teaching candidates was the Gallup Teacher Perceiver Interview. In this model, teaching candidates were asked to respond to open-ended prompts in a face-to-face interview. The purpose was to see how well responses aligned with common themes that characterized those teachers most successful at working with students. In 2005, Gallup developed Teacher Insight, which again asked candidate's questions intended to reveal their attitudes, beliefs and behaviors; however, the Teacher Insight pre-screener was entirely

online and contained only 40 questions. Applicant responses were assessed on how well they aligned with the work-related characteristics and skills inherent in high-achieving teachers. The objective was to "help schools hire the best teachers…fast" (Metzger & Wu, 2008).

The idea behind teacher pre-screening programs is the belief that work-related characteristics and skills are just as important as pedagogical skills and content knowledge. Interestingly, recent research on pre-screeners supports this position. According to Goldhaber, Grout & Huntington-Klein (2014), screening scores have a strong relationship with teacher effectiveness in student achievement as well as teacher attrition, and the magnitudes of these relationships are educationally meaningful: a one standard deviation increase in screening scores is associated with an increase of about 0.07 standard deviations of student math achievement, a marginally significant increase of 0.03-0.05 standard deviations of student reading achievement, and a decrease in teacher attrition of 2.5 percentage points.

Similar findings were noted in a Brookings Institution report, "The Power of Teacher Selection to Improve Education," which describes the teacher selection process in Washington, DC public schools. In 2009, three additional screening assessment tools were added to the teacher application process. Results of the pre-employment screening measures, when coupled with more traditional indicators of achievement such as an applicant's GPA, were able to "strongly predict an individual's performance on the district's teacher evaluation system" (Jacob, 2016). In other words, statistically valid pre-employment screeners can be an invaluable means of determining which teachers are more likely to be effective (Smith, 2006). With research supporting their use and effectiveness, many school districts are starting to use online pre-screening instruments as an integral part of their hiring process.

2.8 The Importance of Job-Fit

The success of any organization is dependent on the performance of the people within the organization. Although many organizations have the liberty and latitude to remove personnel who are deemed to be performing at less than the desirable level, schools do not always have that freedom (Place & Vail, 2013). Consequently, the best approach for school districts is to identify quality applicants at the application stage of the hiring process. Prior research has found that credentials alone have very little predictive quality in terms of student achievement or teacher effectiveness. Because many of the conventional techniques traditionally used to predict teacher effectiveness have proven unreliable, many school districts are turning to the "job-fit" business model for hiring and retaining the right candidates for the job.

The potential for improving workforce quality through effective hiring practices is broadly supported by research from the field of personnel economics and industrial psychology (Goldhaber, Grout & Huntington-Klein, 2014). Faced with an increasingly competitive business environment, many employers are starting to use online screening instruments to identify potential employees' work related characteristics and skills and use the results to place applicants in the correct "job-fit." Job-Fit refers to the theory that knowing an applicant's work-related characteristics and skills will reveal insights about his or her adaptability within an organization.

In a recent survey, 40 percent of Fortune 100 companies indicated that their employment selection systems included some form of psychological or job-fit testing. In fact, eight out of the top ten private employers now administer pre-employment work-related characteristics and skills tests during their job application for at least some positions (Passen, 2015). A survey by the American Management Association showed that 44 percent of its responding members used some form of psychological or job-fit testing to select employees (Shaffer & Schmidt, 1999).

While cognitive ability tests continue to be the most commonly used form of psychological testing in the workplace, work-related characteristics and skills tests are being used more frequently.

By measuring a potential employee's work-related characteristics and skills, employers are better able to understand how the applicant's personal characteristics can impact job performance, long-term success, and their overall "fit" within the organization. Moreover, understanding and quantifying an applicant's work-related characteristics and skills not only promotes data-driven decisions, but also helps reduce total recruitment costs and can boost retention rates (Passen, 2015).

2.9 AppliTrack

Like Gallup's Teacher Insight program, AppliTrack is an online, predictive applicant screening assessment. According to the developer, Frontline Technologies, it "gives [districts] the tools to identify the candidates most likely to succeed" ("We Make," 2014). The AppliTrack program is owned by Frontline Technologies, a company that develops and delivers cloud-based K-12 education software to school districts in the United States. Frontline currently serves more than 3,000 clients across the U.S., including more than 14 percent of the public school districts in the country. The company claims a 99.9% retention rate and an 87% customer rating. The AppliTrack pre-screener, formerly known as Teacher Fit, is Frontline's most widely used product. Since its introduction in 2008, Frontline boasts that nearly 170,000 candidates have completed the assessment (Frontline, 2015).

The AppliTrack pre-screener evaluates and scores candidates in six categories: 1) Fairness and Respect, 2) Concern for Student Learning, 3) Adaptability, 4) Communication and

Persuasion, 5) Planning and Organizing, and 6) Cultural Competence. Candidates are ranked against each other on a curve, giving them a stanine score between 1 and 9. A score of 7 or better in a category would put the candidate in roughly the top 23% of the applicants taking the test. School districts have the ability to vary criteria, including cut-off scores, depending on the position and volume of applicants. The AppliTrack pre-screener is completed online and offsite and includes several multiple-choice questions, short answer and open-ended essay questions. Sample questions can be found in Appendix C.

2.9a AppliTrack Measured Characteristics

While school districts utilizing the AppliTrack pre-screener have the ability to vary the desired scores and/or applicant criteria depending on the position and volume of applicants, all AppliTrack questions are designed to evaluate an applicant's work-related characteristics and skills in the following six areas: 1) Fairness and Respect, 2) Concern for Student Learning, 3) Adaptability, 4) Communication and Persuasion, 5) Planning and Organizing, and 6) Cultural Competence. AppliTrack provided descriptions of each category are as follows:

1) **Fairness and Respect:** Ensuring that fairness is central to all interactions. Acting with integrity and keeping own word. Recognizing that treating others "fairly" does not always mean "equally" (takes individual circumstances into account). Believing that others matter and deserve respect. Respecting and valuing differences among people, including cultural differences.
2) **Concern for Student Learning:** Likes students and enjoys interacting with them and teaching them. Receives satisfaction from seeing students learn and provides them with positive feedback when they do well. Considers each student individually in developing

learning plans. Seeks to motivate students to set and achieve high standards.

3) **Adaptability**: Flexibility and creatively adapts to changing situations. Alters tactics as appropriate to accomplish goals. Able to derive creative solutions to problems. Handles stressful situations calmly.
4) **Communication and Persuasion**: Speaks clearly and articulately. Able to present points of view in a diplomatic but persuasive manner when interacting with parents and others. Understands how comments may resonate with a listener and is able to phrase comments empathetically. Speaks with inflection and conveys interest in addition to information.
5) **Planning and Organizing**: Plans ahead. Thinks through the objectives of interactions with students and how those will support the year's final goals. "Wings it" only when learning needs require this flexibility. Thorough in preparation and follow-through (e.g., grading papers).
6) **Cultural Competence**: Has an understanding and awareness of his/her cultural background and how the cultural background of others (students in particular) affects learning. Understands that cultural background also influences teaching style. Recognizes that students often interact with others who have similar cultural backgrounds ("We Make," 2014).

2.9b AppliTrack Questions

Polaris Educational Systems, a Division of Polaris Assessments, developed the AppliTrack pre-screener questions. Polaris Educational Systems is a consulting firm that focuses on the design and implementation of pre-employment and promotion assessment systems for K-12 school districts. The six work-related characteristics and skills measured by the AppliTrack

pre-screener are rooted in early pre-screening instruments such as Haberman's Star Teacher Interview, which identified 16 highly sought characteristics typical in quality teachers, Gallup's Teacher Perceiver Interview, which identified characteristics typically found in high achieving educators, and the more recent Teacher Insight program, which limited and narrowed the number of questions asked and moved the process online. Interestingly, the characteristics and skills measured by the AppliTrack pre-screener can also be found in well-established personality models, such as the five-factor model of personality.

The five-factor model, also known as the big-five, incorporates five different variables into a conceptual model for describing personality: 1) openness; 2) conscientiousness; 3) extraversion-introversion; 4) agreeableness; and 5) neuroticism. Using the big-five model as a foundation, AppliTrack pre-screener questions seek to identify characteristics in people that are likely to have an impact on their work and environment. For example, *extraversion* is defined as "a trait characterized by a keen interest in other people and external events, and venturing forth with confidence into the unknown" (Popkins, 1998). This personality trait corresponds with the AppliTrack measured characteristic *Concern for Student Learning,* in which a high performing teacher "Receives satisfaction from seeing students learn and provides them with positive feedback when they do well." ("We Make," 2014).

Finally, Frontline also notes that applicant responses are considered alongside "responses of known, high-performing employees" and that scores are correlated to determine "how well and applicant will do based on their responses to the same assessments" (We Make," 2014). Unfortunately, neither Frontline nor Polaris have made additional information about the known, high-performing employees or the method used to correlate their scores available.

2.9c AppliTrack Adverse Impact Results

As part of Frontline Technologies regular monitoring and continuous improvement activities, adverse impact reviews are conducted periodically. Title VII of the 1964 Civil Rights Act makes it illegal for an employment practice or policy to have a disproportionately adverse effect on members of protected classes unless there is documented evidence of the business necessity associated with the use of the procedure (e.g., that it is a valid predictor of performance). In response to Title VII, the *Uniform Guidelines on Employee Selection Procedures* (published in 1978 by the U.S. Equal Employment Opportunity Commission, Department of Labor, and Department of Justice) defines adverse impact as: "a substantially different rate of selection in hiring, promotion, or other employment decision which works to the disadvantage of members of a race, sex, or ethnic group" (Section 16).

Operationally, adverse impact is defined a number of ways. The most common way is the "80% rule" (also known as the "four-fifths rule"). According to the 80% rule, adverse impact exists if the passing rate for protected class members is less than 80% of the passing rate for non-members of the class. For example, if 65% of protected class members pass a particular assessment and 85% of non-members pass the same assessment, the adverse impact ratio (AIR) is .76 (i.e., 65% / 85%). Because this ratio is less than .80 (i.e., 80%), evidence of adverse impact is considered to exist. Ratios at or above .80 are generally interpreted as showing no or acceptable levels of adverse impact (Frontline, 2015).

Table 3 provides a summary of adverse impact results for the AppliTrack assessment using the Overall Score on the assessment. Specifically, AIRs were calculated using successively higher stanine levels as the "Passing" score. In all cases, the subscale analyses

showed the same results as found for the Overall Score: that any reasonable use of the assessment is unlikely to produce adverse impact at levels that would violate the 80% rule.

Table 3: Adverse Impact Results for AppliTrack

Table 1

GROUP	#	2	3	4	5	6	7	8	9
White	140,380	-	-	-	-	-	-	-	-
All Minorities	28,225	0.99	0.98	0.95	0.94	0.94	0.97	1.03	1.09
Asian/Pacific Islander	3,542	1	0.99	0.97	0.97	0.99	1.05	1.17	1.41
Black/African American	12,348	0.99	0.97	0.94	0.91	0.9	0.92	0.96	0.95
Hispanic or Latino	8,112	1	0.99	0.97	0.96	0.96	0.99	1.04	1.14
Native American	682	0.99	0.97	0.92	0.89	0.9	0.95	0.99	1
Other	3,541	0.99	0.98	0.97	0.98	1	1.05	1.14	1.14
Male	43,304	-	-	-	-	-	-	-	-
Female	125,597	1	1.01	1.02	1.01	1.01	1.01	0.92	0.78

Note: Total of 169,975 candidates; not all candidates provided ethnicity and gender information. AIRs calculated by dividing minority passing rates by White passing rates and Female passing rates by Male passing rates.

Frontline Technologies neither endorses nor recommends against the use of passing standards on the TeacherFit test. If passing standards are used, Frontline Technologies recommends against cut-offs that are higher than Stanines 4 or 5.

2.9d AppliTrack Validity

Evidence of validity is important to a school district for a number of reasons. Primary among these is that statistical validation documentation is the strongest evidence that a measure will help the district select the right people. Additionally, validation documentation is necessary if regulatory or legal entities review a district's hiring practices. Validation can take a number of forms, but the strongest form involves developing multiple sets of data that provides a pattern of consistent support for the use of a test. Frontline's AppliTrack utilizes proprietary job-specific analytic techniques to supply one part of that pattern. Its reliance on the use of proven testing approaches provides a second source of support. In addition, AppliTrack conducts statistical validation studies for all of its measures to verify the validity of the instruments in the environments in which they will be used.

In short, AppliTrack's approach to validity ensures that the programs used in a school district reliably and accurately predict performance on the targeted jobs. The result is that districts do not need to "reinvent the wheel" by conducting their own validation study ("We Make," 2014).

2.9e AppliTrack Limitations

In November 2011, Chicago teachers engaged in a bitter battle with the Chicago Board of Education over various issues, including requiring those teachers who "failed" the AppliTrack prescreening (then called Teacher Fit) to wait 18 months before reapplying. To teacher organizations and union leaders, the test was seen as "a violation of labor law and a disservice to teachers and students" (Lydersen, 2011). In a complaint filed with the Illinois Educational Labor Relations Board, the union alleged that five of the 31 pre-screener questions constituted illegal intimidation and interference. Interestingly, in October 2015 the Shawnee Mission School District, the school district from which data for this study came, made the decision to discontinue its use of the AppliTrack pre-screening instrument for screening potential teachers. The district will continue to use the AppliTrack hiring and data storage programs.

2.10 Summary of Literature Review

This study will research the relationship between work-related characteristics and skills measured during the AppliTrack pre-screening process and teacher hiring and retention. There is a great deal of existing research pertaining to why teachers leave the profession. There is very little existing research about why teachers stay, and even less about what work-related characteristics and skills may correlate with departure. This study will contribute to existing

research by potentially establishing a predictive relationship between an applicant's work-related characteristics and skills and his or her hiring and retention in the classroom. This information is important because long-standing research supports hiring a quality teacher has a positive effect on student success and achievement. This study is also important because school districts must not only continue to recruit and hire teacher candidates with the right qualifications, but also make an effort to retain those teachers. To that end, many school districts are starting to utilize commercial, online pre-screening instruments such as Frontline's AppliTrack to assess not only a candidate's potential for job-fit and success in the classroom, but their longevity as well.

CHAPTER 3

METHODOLOGY

3.1 *Overview*

This study asks if there is a correlation between the work-related characteristics and skills measured in applicants by the AppliTrack pre-screening instrument and teacher hiring and retention. The research questions of this study are:

1) Is there a relationship between work-related characteristics and skills measured by the AppliTrack pre-screening instrument and teacher hiring and retention?
2) Which work-related characteristic(s) or skill(s) measured by the AppliTrack pre-screening instrument demonstrate a relationship with teacher hiring and retention?

In order to answer these questions, data was collected and a means comparison conducted on 6,117 applicants who completed the AppliTrack pre-screener via the Shawnee Mission School District website between January 2010 and May 2015 (Table 7). Additionally, a logistic regression test was run which considered applicant's individual scores in six work-related categories: 1) Fairness and Respect, 2) Concern for Student Learning, 3) Adaptability, 4) Communication and Persuasion, 5) Planning and Organizing, and 6) Cultural Competence. No other variables were used in this test (Table 8).

Finally, of the 6,117 applicants who completed the AppliTrack pre-screener between January 2010 and May 2015, 5,703 were not hired after completing the pre-screener, while 414 were. Data on the 414 teachers hired was used to run a right-censored, competing risks survival analysis (Tables 11 & 12). The survival analysis was chosen because the outcome measure can be effectively specified as "time to event" and the effects of predictors on conditional risk (hazard) of event can be predicted with high power. A right-censored model was used,

controlling for time of entry into risk set, because individuals had different start times. The results are discussed in Chapter 4.

3.2 Independent Variable

The independent variables are the candidates' scores in six work-related categories from the AppliTrack pre-screening instrument. Candidates completed the pre-screener between January 2010 and May 2015 while applying for a teaching position with the Shawnee Mission School District.

3.3 Dependent Variable

The dependent variable is the candidate being hired and their retention as a teacher in the Shawnee Mission School District.

3.4 Null Hypothesis

The null hypothesis is there will be no significant relationship between work-related characteristics and skills measured by the AppliTrack pre-screening instrument and a teacher's hiring and retention. The alternative hypothesis is there will be a positive, significant relationship between the work-related characteristics and skills measured by the AppliTrack pre-screening instrument and a teacher's hiring and retention.

3.5 The Shawnee Mission School District

The Shawnee Mission School District (Kansas Unified School District 512) is one of the major school districts in the Kansas City metropolitan area. It is in northeast Johnson County,

Kansas, and encompasses 72 square miles in suburban Johnson County. There are 33 elementary schools (grades K-6), five middle schools (grades 7-8), and five high schools (grades 9-12.) In 2015, there were 27,057 students enrolled in the district, 51.18 percent male students and 48.82 percent female students. 38 percent of the students enrolled in the Shawnee Mission School District are classified as economically disadvantaged. This is significant as the district has seen a 7% increase in students eligible for Free and Reduced meals since 2008. The Kansas Department of Education lists the district's ethnicity breakdown as 65.45 percent white, 17.23 percent Hispanic, 8.82 percent African American and 8.60 percent other (KSDE, 2015).

Because this study seeks to assess whether or not a teacher's work-related characteristics and skills correlate with their hiring and retention, faculty demographic information for 2015 was also considered. In 2015, 1,971 certified teachers were employed with the SMSD (Table 4).

Table 4: SMSD Demographic Information

Employee	**Percentage**
Female	80%
Male	19%
Hispanic or Latino	1%
African American	1%
White	96%
Elementary Teacher	44%
Middle School Teacher	12%
Secondary Teacher	26%
SPED/ESOL Teacher	10%
Career & Tech Ed	3%
School Specialist	4%
School Support	1%
Leadership/Administration	4%

Teacher Age	**Percentage**
20-24	0%
25-29	7%
30-34	12%
35-39	11%
40-44	12%

45-49	11%
50-54	11%
55-59	12%
60-64	12%
65 and Over	7%

3.6 Data Collection

With the help of the Shawnee Mission School District's Human Resources and Testing and Assessment departments, data from several sources was brought together. The final data-set included information for all 6,117 applicants who completed the AppliTrack pre-screener between January 2010 and May 2015. It should be noted that the information used in this study includes only certified applicants seeking a teaching position in the Shawnee Mission School District. While the initial data also included classified and administrative results, only certified teacher results were evaluated. It is also important to note that some of the 6,117 applicants who completed the AppliTrack pre-screener may not have been qualified to apply for a certified position. For example, an applicant may have completed the pre-screener without having the educational requirements to accept a certified teaching position. Whatever the reason, of the 6,117 who completed the AppliTrack pre-screener between January 2010 and May 2015, 5,703 were not hired as certified teachers and 414 were hired as certified teachers. At the time of this study, 334 of the 414 hired remain employed as teachers in the Shawnee Mission School District. Of the 80 no longer employed as teachers in the district, 75 left voluntarily and 5 left involuntarily.

Despite having access to departing employee's information, establishing a specific reason for their leaving the district proved challenging. When leaving a school district, the departing employee has the option to disclose the reason he or she is leaving or not. For those who do

choose to disclose the reason for their departure, the options are seen in Table 5. The most widely chosen options were Resignation or to simply put nothing at all. For the purpose of this study, employees who left the district are separated into two categories: Resigned Voluntarily and Resigned Involuntarily.

Table 5: Departure Options

Departure Options
Resignation
Accepted a teaching position out of state
Accepted a teaching position in state
Resigned during Administrative Review Process
Leaving teaching profession
Health
Certified Retirement
Dismissed
Incentive 2014-2015
Failure to return from leave
Elimination of Position
No Response

The data provided by the Shawnee Mission School District included AppliTrack pre-screener scores, which included scores for the six measured categories and an overall score for all 6,117 applicants. All scores were between 1 and 9, with 9 being the highest achievable score. The individual category scores fell into one of six categories: 1) Fairness and Respect, 2) Concern for Student Learning, 3) Adaptability, 4) Communication and Persuasion, 5) Planning and Organizing, and 6) Cultural Competence. More specific information was provided on the 414 candidates subsequently hired by the district. This information included the date the pre-screener was completed and submitted, the applicant's overall and category scores, and notes. The notes included the date of hire, the name of the district representative who contacted the applicant, and any additional information relative to the hire; for example, "Not licensed in KS yet" or "Have asked applicant to upload transcripts."

The data provided also included links to two additional reports. The Summary Report (Appendix A) summarizes the applicant's scores and provides a brief interpretation of what scores in a specific range may mean. For example, a score of 5 in the Fairness and Respect category means "the individual values treating others fairly and with respect. The individual strives to understand and respect the opinions of others (students, other teachers, parents). He or she typically approaches others with honesty and integrity and appreciates diversity. While the individual is likely to be effective within this area, approximately 25% of individuals scored higher in this dimension" (Frontline, 2015). The Interviewer Report (Appendix B) is used when an applicant is moved from the pre-screening stage to the interview stage. This report provides a score level for each category: Low, Average, and High, as well as typical interview questions and an example of what a strong applicant response might include. For example, a question under Accountability reads: *Describe a time when you were faced with a stressful situation. What was the situation and what did you do to cope?* According to the AppliTrack Interviewer Report, a strong applicant response would include "effective techniques for dealing with stressful situations, putting things in perspective, resolving the situation rather than ignoring it, etc." (Frontline, 2015).

In addition to the Shawnee Mission School District Human Resources department, information was also solicited from the district's Testing and Assessment department. This office confirmed who was and was no longer employed with the district and, of particular importance to this study, whether those who left did so voluntarily or involuntarily. Testing and Assessment also provided additional employee information, as seen in Table 6:

Table 6: AppliTrack Data for Hires

AppliTrack Data for Hires
Hire Month
Hire Year
Leave Month (if applicable)
Leave Year (if applicable)
The month the position was accepted
The number of months the employee could have stayed since hire date
The number of months the employee did stay since hire date
The difference in months
Individual AppliTrack Trait Scores for Adaptability
Individual AppliTrack Trait Scores for Communication
Individual AppliTrack Trait Scores for Concern for Student Learning
Individual AppliTrack Trait Scores for Cultural Competency
Individual AppliTrack Trait Scores for Fairness and Respect
Individual AppliTrack Trait Scores for Planning and Organizing
Overall AppliTrack score
The year in which the teacher earned his/her undergraduate degree
Gender
Secondary or Elementary certification
Whether or not the employee has a graduate degree

3.7 Analyzing the Data

This study considers individual and overall scores of 6,117 applicants who completed the AppliTrack pre-screener for the Shawnee Mission School District between January 2010 and May 2015. As seen in Chapter 4, a means comparison test (Table 7) and a logistic regression test (Table 8) were run on all 6,117 applicants. No additional variables were considered in the logistic regression. To further test the null hypothesis and determine whether a specific correlation exists between the work-related characteristics and skills measured by the AppliTrack pre-screener and teacher retention, a right-censored, competing risks survival analysis (Cox regression) was run on the 414 applicants hired. The survival analysis was chosen because the outcome measure can be effectively specified as "time to event" and the effects of predictors on

conditional risk (hazard) of event can be predicted with high power. A right-censored model was used, controlling for time of entry into risk set, because individuals had different start times.

3.8 Expected Findings

As the Review of Literature makes clear, effective teachers can have a profound effect on student outcomes. Arif, et al. (2012) found that teacher effectiveness is perceived to exist as a consequence of the characteristics of a teacher. Sanders and Rivers (1996) found that a teacher with certain characteristics could enhance student academic achievement. Thus, it is reasonable to assume that applicants with higher scores in the work-related characteristics and skills measured by the AppliTrack pre-screener: Fairness and Respect, Concern for Student Leaning, Adaptability, Communication and Persuasion, Planning and Organizing, and Cultural Competence may have an increased likelihood of being hired and, correspondingly, a greater probability of staying.

In 2015, Robertson-Kraft & Duckworth (2015) conducted a study on the predictive validity of personal qualities not typically collected by school districts during the hiring process. Research considered how a teacher's *grit*, a disposition toward perseverance and a passion for long-term goals, explained variance in novice teachers' effectiveness and retention. Results showed that *grittier* teachers were more likely to complete the school year and also outperformed their less gritty colleagues, a conclusion that supports the idea that "the work-related characteristics and skills of the teacher is a significant variable. Indeed, some would argue it is the most significant variable" (p. 506). Given the existence of research on grit in the classroom and the importance of perseverance in any difficult career, a correlation between an applicant's Adaptability score and his/her retention in the classroom is probable.

3.9 Summary of Methodology

Between January 2010, and May 2015, 6,117 applicants completed the AppliTrack pre-screener in an effort to gain a teaching position with the Shawnee Mission School District, a district of 27,057 students and 1,971 certified employees. Scores in six categories: Fairness and Respect, Concern for Student Leaning, Adaptability, Communication and Persuasion, Planning and Organizing, and Cultural Competence, were collected for each of the 6,117 applicants and tested using a means comparison and a logistic regression model. Additionally, right-censored, competing risks survival analysis (Cox regression) was run on the 414 applicants hired. 334 of whom are still employed as teachers in the district. The survival analysis was chosen because the outcome measure can be effectively specified as "time to event" and the effects of predictors on conditional risk (hazard) of event can be predicted with high power. A right-censored model was used, controlling for time of entry into risk set, because individuals had different start times.

CHAPTER 4

FINDINGS

4.1 Overview

This study considers the scores of 6,117 teaching applicants who completed the AppliTrack pre-screening assessment for the Shawnee Mission School District between January 2010 and May 2015. A means comparison and a logistic regression test were run using the individual scores of all 6,117 applicants, while a right-censored, competing risks survival analysis (Cox regression) was run on the 414 applicants hired. The survival analysis was chosen because the outcome measure can be effectively specified as "time to event" and the effects of predictors on conditional risk (hazard) of event can be predicted with high power. A right-censored model was used, controlling for time of entry into risk set, because individuals had different start times. Of the 414 hired, 334 are still employed as teachers with the district. Of the 80 teachers no longer employed with the Shawnee Mission School District, 75 left voluntarily and 5 left involuntarily.

The research questions this study seeks to answer are:

3) Is there a relationship between work-related characteristics and skills measured by the AppliTrack pre-screening instrument and teacher hiring and retention?
4) Which work-related characteristic(s) or skill(s) measured by the AppliTrack pre-screening instrument demonstrate a relationship with teacher hiring and retention?

The null hypothesis is there will be no significant relationship between work-related characteristics and skills measured by the AppliTrack pre-screening instrument and teacher hiring and retention. The alternative hypothesis is there will be a positive, significant relationship

between work-related characteristics and skills measured by the AppliTrack pre-screening instrument and teacher hiring and retention.

4.2 Testing the 6,117:

In August 2015, pre-screener scores for 6,117 applicants who completed the AppliTrack pre-screener between January 2010 and May 2015 were obtained and organized into a single data set. A simple means comparison was run comparing individual scores from the 5,703 applicants not hired by the SMSD with the 414 applicants who were. At this time, no other variables were considered. As seen in Table 7, the averaged scores for the 5,703 applicants not hired by the Shawnee Mission School District were lower than the scores for the 414 applicants hired in every assessed work-related characteristic and skill category. In other words, applicants who showed a greater aptitude in the work-related characteristics and skills measured by the AppliTrack pre-screener had a greater probability of being hired as a teacher.

Table 7: AppliTrack Scores for All Applicants

Row Labels	Status	Adaptability	Persuasion	Concern	Cultural Competence	Fairness/Respect	Planning
Not Hired	5703	6.25	6.05	6.18	5.39	5.82	6.32
Hired	414	6.93	6.73	6.89	5.70	6.58	7.04
Grand Total	**6117**	**6.33**	**6.13**	**6.26**	**5.43**	**5.91**	**6.41**

Next, a logistic regression test of the 6,117 applicants considered whether any specific work-related characteristics or skills measured by the AppliTrack pre-screener had statistical

significance in getting hired. The test compared the scores of the 334 employees who are currently active (those who were hired and are still employed as teachers with the district) and the 80 inactive (those who were hired and are no longer employed as teachers with the district), with the 5,703 applicants who were not hired at all. As seen in Table 8, results show that Fairness and Respect and Planning and Organizing are both statistically significant at the .001 level. Both coefficients were positive, indicating that higher scores in each of these areas could be associated with a stronger likelihood of being hired.

Results of this study are consistent with findings from previous research that found planning and organizing essential to teaching effectiveness. A study by Thompson et al (2008) found that being prepared ranked as one of the top character traits of quality teachers. A later study by Arif et al. (2012) found that teachers who described themselves as satisfied, successful, and effective possessed the ability to be dependable, self-disciplined, persistent and organized. Of course, fairness and respect are equally important to the teaching profession and previous studies also have confirmed their significance. In 2009, Hopkins examined what qualities principals look for when hiring new teachers. Sensitivity, compassion for others, a big heart for kids, and a caring attitude were noted as being essential to not only being hired, but to teacher effectiveness and student achievement. Fairness and respect can also be seen in studies on second stage teachers, those with 3-10 years experience, who chose teaching not only for their love of working with students, but also because of their commitment to social justice and their belief that teaching can improve society on a broader scale (Coggins & Diffenbaugh, 2013).

Table 8: Scores Hired vs. Not Hired

Coefficients:	Estimate Standard	Error	z Value	Pr (.z)
Intercept	-4.24626	0.20877	-20.339	<2e-16***
Adaptability	0.04511	0.03802	1.187	0.235
Communication and Persuasion	0.04141	0.03848	1.076	0.282
Concern for Student Learning	0.01400	0.03817	0.367	0.714
Cultural Competence	-0.01561	0.02113	-0.739	0.460
Fairness and Respect	0.14192	0.03293	4.310	1.63e-05***
Planning and Organizing	0.11953	0.02812	4.251	2.13e-05***

4.3 Results of the 6,117:

A summary of key findings on the 6,117 tested can be considered as they apply to this study's research questions: 1) Is there a relationship between work-related characteristics and skills measured by the AppliTrack pre-screening instrument and teacher hiring and retention? And 2) Which work-related characteristic(s) or skill(s) measured by the AppliTrack pre-screening instrument demonstrate a relationship with teacher hiring and retention? Results from the means comparison test show that overall scores for applicants not hired were lower in all six measured categories, which supports the alternative hypothesis and the possibility that there is a relationship between the work-related characteristics and skills measured by the AppliTrack pre-screening instrument and an applicant being hired. The means comparison does not help with question two: which work-related characteristic(s) or skill(s) measured by the AppliTrack pre-screening instrument demonstrate a relationship with teacher hiring? To test this question, a

logistic regression test of the 6,117 was conducted. The test compared the scores of the 334 employees who are currently active (those who were hired and are still employed as teachers with the district) and the 80 inactive (those who were hired and are no longer employed as teachers with the district), with the 5,703 applicants who were not hired at all. Results indicate that Fairness and Respect and Planning and Organizing were both statistically significant at the .001 level. Both coefficients were positive, indicating that higher scores in each of these areas can be associated with a stronger likelihood of being hired. Thus, this result rejects the null hypotheses and indicates that higher scores in Fairness and Respect and Planning and Organizing are statistically significant to an applicant being hired.

It is important to note that the AppliTrack pre-screening instrument is only one part in the process of hiring a certified teacher. Many pre-employment factors can and do play a role in qualifying or disqualifying an applicant—GPA, transcripts, letters of recommendation and work experience to name a few. Thus, it's not simply a matter of applicants with high scores in statistically significant work-related characteristics and skills being hired. Higher scores in statistically significant traits are only one of many factors involved when considering a potential employee. However, it is worth noting that those applicants who made it to the interview stage and were ultimately hired had higher scores in all areas, particularly in the areas of Fairness and Respect and Planning and Organization. When controlling for all traits, these two stood out.

4.4 Testing the 414:

To further test the null hypothesis, a right-censored, competing risks survival analysis (Cox regression) was run on the 414 applicants hired. The survival analysis was chosen because the outcome measure can be effectively specified as "time to event" and the effects of predictors

on conditional risk (hazard) of event can be predicted with high power. A right-censored model was used, controlling for time of entry into risk set, because individuals had different start times. Table 9 lists information relevant to the 414 teachers hired.

Table 9: Information on the 414

Year	**Number of Hires**
2010	26
2011	77
2012	118
2013	105
2014	77
2015	11
Gender	
Males	70
Females	344
Grade Levels	
Elementary	228
Secondary	186
Ethnicity	
White	397
Non-White	17

As seen in Table 10, six short sequence models were considered. Specific model information can be seen in Appendix D. Models 1-3 (shown in Table 11) were run using all six predictors and the teachers' employment status: those who were hired and stayed, those who were hired and departed voluntarily, and those who were hired and departed involuntarily. Models 4-6 (Table 12) consider the Adaptability trait alone, the Communication and Persuasion trait alone, and, finally, the Adaptability and Communication and Persuasion traits together.

Table 10: Analysis Models (Short Sequence Models)

Model	**Predictors**
Model 1	Leave vs. No Leave
Model 2	Voluntary Leave vs. No Leave + Involuntary Leave
Model 3	Involuntary Leave vs. No Leave + Voluntary Leave
Model 4	Adaptability Alone
Model 5	Communication & Persuasion Alone
Model 6	Adaptability + Communication & Persuasion

4.4a Models 1 & 2:

Model 1 compares the 80 teachers who left their position as a teacher with the Shawnee Mission School District voluntarily or involuntarily with the 334 who did not leave. Results show that Cultural Competency is the predictor most associated with survival (p-value=0.0183). The Hazard Ratio of .874 indicates that a one-point increase in Cultural Competency score is associated with 13% increase in likelihood of staying. In other words, a one-point increase in Cultural Competency decreases the hazard of leaving by 13%. As a result of these findings, the null hypothesis is rejected, as at least one of the measured predictors appears to be associated with teacher retention. Not surprisingly, this finding is in keeping with existing research that has found the turnover rate considerably higher in high-poverty schools where cultural competency is essential to a teacher's success and longevity. This finding also supports long-documented research that schools and classrooms with at-risk populations are often most affected by teacher turnover (Hughes, 2012). It stands to reason that teachers who lack an understanding and awareness of how the cultural background of others affects learning are more likely to leave teaching. Not surprisingly, respecting and valuing differences among people, including cultural differences, is one of the characteristics defined in the Fairness and Respect trait, which was previously found to have a statistical correlation to being hired as a teacher (Table 8).

Model 2 compares those who left the district voluntarily with those who did not leave or left the district involuntarily. Results of Model 2 support the findings from Model 1 and show that teachers with higher Cultural Competency scores are 12% more likely to stay rather than voluntarily leave. The statistical significance found in Model 1 is reduced slightly with the addition of those who involuntarily leave. Still, this model does support the alternative

hypothesis, as at least one of the work-related characteristics measured by the AppliTrack pre-screener shows statistical significance with whether a teacher stays or leaves the profession.

4.4b Model 3:

In Model 3, the five teachers who involuntarily left the district were isolated and compared with those who did not leave and those who left voluntarily. Results in this model show something new. Both Adaptability and Communication and Persuasion are statistically significant. In fact, those with higher Adaptability scores are three times more likely to involuntarily leave, versus stay or leave voluntarily. Surprisingly, one unit of Adaptability significantly increases the odds of involuntary leaving versus not leaving or voluntarily leaving. This finding does seem to contradict the Robertson-Kraft & Duckworth (2015) study on the predictive validity of a teacher's *grit*, a disposition toward perseverance and a passion for long-term goals. AppliTrack defines Adaptability as "Flexibility and creatively adapts to changing situations. Alters tactics as appropriate to accomplish goals. Able to derive creative solutions to problems. Handles stressful situations calmly" ("We Make," 2015). Given existing research on grit in the classroom and the importance of perseverance in any difficult career, the statistical significance of high Adaptability scores and involuntary departure appears incongruous. A possible explanation may be the unique and unintended relationship between Adaptability and Communication and Persuasion.

Communication and Persuasion had an expected coefficient: higher scores tend to be associated with not being asked to leave involuntarily. However, results of this model also show that those with higher Adaptability scores are three times more likely to involuntarily leave, versus stay or leave voluntarily. One explanation may be that the AppliTrack pre-screener is

unintentionally distributing applicant responses and attributes between the Adaptability and Communication and Persuasion characteristics. In other words, questions designed to ascertain an applicant's strengths in one category are inadvertently affecting his or her scores in others. To test this theory, Models 4 and 5 consider the Adaptability trait and the Communication and Persuasion traits separately, while Model 6 considers them together.

Table 11: Models 1-3

	Model 1		Model 2		Model 3	
	Coefficient	H.R	Coefficient	H.R	Coefficient	H.R
Month Position was Accepted	0.026 (0.011)	1.027 **	0.026 (0.011)	1.027 **	0.062 (0.043)	1.065
Adaptability	0.066 (0.120)	1.069	0.017 (0.122)	1.018	1.178 (0.555)	3.248 **
Communication & Persuasion	0.135 (0.123)	1.145	0.196 (0.128)	1.217	-0.898 (0.399)	0.407 **
Concern for Student Learning	-0.081 (0.118)	0.922	-0.061 (0.121)	0.941	-0.549 (0.524)	0.577
Cultural Competence	-0.134 (0.057)	0.874 **	-0.125 (0.058)	0.882 **	-0.322 (0.302)	0.724
Fairness & Respect	0.078 (0.093)	1.082	0.094 (0.096)	1.099	-0.118 (0.334)	0.888
Planning & Organizing	-0.097 (0.078)	0.907	-0.107 (0.079)	0.898	-0.294 (0.306)	0.745
Male Teachers	-0.331 (0.340)	0.718	-0.392 (0.354)	0.675	-0.996 (1.330)	0.369
Elementary Teachers	0.203 (0.239)	1.226	0.241 (0.243)	1.272	0.901 (1.099)	2.464
Post-Graduate Degree	-0.292 (0.239)	0.746	-0.308 (0.243)	0.734	-0.564 (1.098)	0.568
Likelihood Ratio	19.37		20.13		15.48	

4.4c Model 4:

In Model 4, the Adaptability trait was considered alone. When Adaptability was considered without the other traits, there was no statistical significance with a hired applicant staying (not leaving the district) or leaving voluntarily or involuntarily. This implies that, without the Communication and Persuasion trait draining like attributes, the Adaptability trait reflects a more authentic version of its AppliTrack provided description and the characteristics it is intended to measure. Model 4's estimate for the Adaptability trait is coefficient .008, suggesting that Adaptability has essentially no effect whatsoever. The Hazard Ratio is 1, meaning there is no increase or decrease from the baseline level of whether one stays or leaves using Adaptability as a determinant. Thus, Model 4 supports the null hypothesis insomuch that when Adaptability is considered alone, it shows no statistical significance relative to a teacher's retention.

4.4d Model 5:

In Model 5 the Communication and Persuasion trait was tested alone. This test reflects a return of statistically significant results. This is important as it helps further explain the connection between Adaptability and Communication and Persuasion and indicates that, of the two traits, Communication and Persuasion is more significant to the connection. Results from Model 4, the Adaptability trait tested alone, support the null hypothesis and show no statistical significance in teacher retention. Conversely, Model 5, Communication and Persuasion alone, shows statistical significance, with a Hazard Ratio of .563. This is in keeping with existing research that found being sociable, outgoing, talkative, assertive and gregarious are all important for teaching effectiveness and longevity (Arif, et al., 2012). Thus, while Model 3 established a

unique connection between the Adaptability trait and the Communication and Persuasion trait, with the former showing statistical significance in a teacher being asked to leave involuntarily, Model 5 reinforces the notion that the Communication and Persuasion trait is more dominant to the connection and overall more significant to this study.

4.4e Model 6:

Model 6 considers Adaptability and Communication and Persuasion together and results show moderate statistical significance in the Adaptability trait. Given the established connection between the two traits and the results from Model 5, Model 6 stands out as an illogical result. One explanation is that extreme results within the limited sample size have caused the Adaptability trait to appear statistically significant. However, when considered with results from Models 4 and 5, there does not appear to be an actual effect. Thus, while Adaptability is identified in this Model as more significant than Communication and Persuasion, results from Model 4 and Model 5 reject this finding.

Table 12: Models 4-6

	Model 4		Model 5		Model 6	
	Coefficient	H.R	Coefficient	H.R	Coefficient	H.R
Month Position was Accepted	0.066 (0.045)	1.069	0.062 (0.044)	1.065	0.075 (0.044)	1.078 *
Adaptability	0.008 (0.286)	1.009			0.841 (0.467)	2.318 *
Communication & Persuasion			-0.573 (0.281)	0.563 **	-1.14 (0.409)	0.32
Concern for Student Learning						
Cultural Competence						
Fairness & Respect						
Planning & Organizing						
Male Teachers	0.021 (1.148)	1.022	-0.203 (1.156)	0.816	-0.071 (1.157)	0.931
Elementary Teachers	0.568 (0.939)	1.765	0.387 (0.960)	1.474	0.686 (0.995)	1.986
Post-Graduate Degree	0.138 (0.920)	1.148	-0.161 (0.960)	0.851	-0.114 (0.996	0.892
Likelihood Ratio	3.15		7.23		11.25	

*** = p <= 0.010
** = p <= 0.050
* = p <= 0.100

4.5 Results of the 414:

A right-censored, competing risks survival analysis test of 414 teachers hired as teachers by the Shawnee Mission School District between January 2010 and May 2015 was performed. Six models were used: 1) Leave vs. No Leave; 2) Voluntary Leave vs. No Leave and Involuntary Leave; 3) Involuntary Leave vs. No Leave and Voluntary Leave; 4) Adaptability Alone; 5) Communication and Persuasion Alone; and 6) Adaptability and Communication and Persuasion together. Results indicate that the Cultural Competency trait is most associated with survival, with a one-point increase in Cultural Competency score associated with 13% increase in likelihood of staying.

Results in later Models also show a statistically strong relationship between Communication and Persuasion and Adaptability, with higher scores in the former indicating statistical significance in a teacher staying, and higher scores in the latter indicating an increased risk of involuntarily leaving. Still, when tested alone, the Adaptability trait showed no statistical significance with a hired applicant staying employed as a teacher in the district versus leaving voluntarily or involuntarily. Conversely, when the Communication and Persuasion trait was tested alone, it did show statistical significance and a greater likelihood of teacher retention. One explanation is that applicant responses to questions intended to demonstrate Adaptability cross-populated with responses designed to assess other traits, including Communication and Persuasion, thus providing unintended results.

In response to question one, is there a relationship between work-related characteristics and skills measured by the AppliTrack pre-screening instrument and teacher hiring and retention? The answer is yes. Results of the right-censored, competing risks survival analysis conducted on the 414 teachers hired indicate that at least one of the characteristics measured by

the AppliTrack pre-screener appears to be associated with teacher retention. As a result, the null hypothesis is rejected and the alternative hypothesis accepted. In response to question two, which work-related characteristic(s) or skill(s) measured by the AppliTrack pre-screening instrument demonstrate a relationship with teacher hiring and retention? Of the 414 applicants hired as a result of completing the AppliTrack pre-screener, higher scores in Cultural Competency showed a statistically significant correlation with survival, as did, to a lesser degree, the Communication and Persuasion trait. As a result, the null hypothesis is rejected and the alternative hypothesis accepted.

CHAPTER 5

DISCUSSION

5.1 Introduction

With school districts experiencing increasing expectations and decreasing resources, hiring highly qualified, committed teachers is an important challenge. School districts and building administrators must recruit and hire teacher candidates with the right academic qualifications, while at the same time keeping an eye on accountability, academic achievement and retention. The purpose of this study is to address gaps in existing research by identifying a relationship between work-related characteristics and skills measured by the AppliTrack pre-screening instrument and teacher hiring and retention. Existing studies have looked at the relationship between work related characteristics and teacher quality (Hughes, 2012). Others have researched teacher turnover in relation to contextual factors: money, organization, or culture (Ingersoll, 2001). This study considers one school district's use of the AppliTrack pre-screening instrument and seeks to identify a relationship between work-related characteristics and skills measured by the pre-screening instrument and teacher hiring and retention. In so doing, this study hopes to provide school districts with a better understanding of how a teaching applicant's work-related characteristics and skills can affect job performance, long-term success, and their overall fit within an organization.

5.2 Summary of Findings

Between January 2010 and May 2015, 6,117 applicants completed the online AppliTrack pre-screener in an effort to gain a teaching position with the Shawnee Mission School District, a district of 27,057 students and 1,971 certified employees. The AppliTrack pre-screener

measured and scored applicants on six work-related characteristics and skills: 1) Fairness and Respect, 2) Concern for Student Learning, 3) Adaptability, 4) Communication and Persuasion, 5) Planning and Organizing, and 6) Cultural Competence. Results of a means comparison between the 414 applicants hired as teachers and the 5,703 who were not showed higher scores for those hired in all six categories. These results support the alternative hypothesis that an applicant's scores in the specific work-related characteristics and skills measured by the AppliTrack pre-screener may have a positive, significant relationship with whether or not an applicant is hired. These results are also consistent with findings from previous studies that, as a novel and innovative profession, teaching demands certain characteristics and skill traits (Arif et al., 2012) and that many of the variables associated with teaching are non-academic in nature (Getzels & Jackson, 1963).

A logistic regression test of the 6,117 applicants was also conducted. The test compared the scores of the 334 employees who are currently active (those who were hired and are still employed as teachers with the district) and the 80 inactive (those who were hired and are no longer employed as teachers with the district), with the 5,703 applicants who were not hired at all. Results show that Fairness and Respect and Planning and Organizing were both statistically significant at the .001 level. Both coefficients were positive, indicating that higher scores in each of these areas could be associated with a stronger likelihood of an applicant being hired. These results also reject the null hypotheses and further support prior research that indicates a teacher's organization and planning skills are highly correlated to teacher effectiveness (Pittman, 1985), as are a teacher's sensitivity and compassion for others (Hopkins, 2012).

Finally, a right-censored, competing risks survival analysis (Cox regression) was run on the 414 applicants hired. The survival analysis was chosen because the outcome measure can be

effectively specified as "time to event" and the effects of predictors on conditional risk (hazard) of event can be predicted with high power. A right-censored model was used, controlling for time of entry into risk set, because individuals had different start times. Six short-sequence models were used: 1) Leave vs. No Leave; 2) Voluntary Leave vs. No Leave and Involuntary Leave; 3) Involuntary Leave vs. No Leave and Voluntary Leave; 4) Adaptability Alone; 5) Communication and Persuasion Alone; and 6) Adaptability and Communication and Persuasion together. Results showed the Cultural Competency trait was most associated with survival, with a one-point increase representing a 13% increase in likelihood of staying. Results in later models also showed statistical significance in Communication and Persuasion and Adaptability, with higher scores in the latter strongly associated with an increased risk of involuntarily leaving. However, when tested alone, the Adaptability trait showed no statistical significance or increase in the likelihood of leaving voluntarily or involuntarily. Conversely, when the Communication and Persuasion trait was tested alone, it continued to show statistical significance and a decrease in hazard risk. The connection between the two traits suggests that applicant responses to questions intended to establish strengths and/or deficits in one trait may have inadvertently coalesced with responses designed to establish strengths and/or deficits in another.

In summary, in response to the first research question, is there a relationship between work-related characteristics and skills measured by the AppliTrack pre-screening instrument and teacher hiring and retention? The answer is yes. Results of a means comparison showed that applicants hired after completing the AppliTrack pre-screener scored higher in all six categories, suggesting a relationship between higher scores and a greater likelihood of being hired as a teacher. As a result, the null hypothesis is rejected and the alternative hypothesis accepted. In response to the second research question, which work-related characteristic(s) or skill(s)

measured by the AppliTrack pre-screening instrument demonstrate a relationship with teacher hiring and retention? Results of a logistic regression test found that Fairness and Respect and Planning and Organizing were both statistically significant at the .001 level, indicating that higher scores in these categories could be associated with a stronger likelihood of an applicant being hired.

Finally, a right-censored, competing risks survival analysis was run on the 414 applicants hired as teachers as a result of completing the AppliTrack pre-screener. Higher scores in the Cultural Competency category showed a statistically significant correlation with survival; with a one-point increase in score associated with 13% increase in likelihood of staying. Applicants who scored higher in the Communication and Persuasion trait also showed a decrease in hazard risk and a greater likelihood of survival. As a result of these findings, the null hypothesis is rejected and the alternative hypothesis accepted.

5.3 Contributions to Literature

While research on teacher retention and the relationship between work-related characteristics and teacher quality exists, most studies address contextual factors: money, organization, or culture (Ingersoll, 2001). Few studies have considered a connection between teacher hiring and retention and the work-related characteristics and skills measured in applicants during the pre-screening process. This study will contribute to existing literature as results show that work-related characteristics and skills measured by the AppliTrack pre-screener do have a correlation with whether or not an applicant gets hired and, subsequently, whether or not he or she stays in the profession. This is important because existing research confirms that hiring a quality teacher has a significant effect on student success and achievement. Moreover, defining

which non-cognitive, work-related characteristics and skills correlate with teacher hiring and retention will allow school districts to make more efficient and informed choices when considering applicants.

5.4 Limitations of Study

One of the key limitations in regard to the first research question is that results were only able to establish descriptive results. Because there are other variables associated with the hiring process, the true relationship between AppliTrack results and an employee being hired or remaining employed cannot be truly isolated. As was discussed in Chapter 4, there are many factors that result in an applicant being screened out or in—GPA, transcripts, letters of recommendation and work experience to name a few. As a result, this study was able to test that, among those 414 hired, those with higher scores in two traits, Planning and Organizing and Fairness and Respect, were more likely to be hired; however, the results are correlational, not causal. In the end higher scores in those two work-related characteristics did not in and of themselves result in an applicant being hired, but those applicants who were hired did indeed have higher scores in those specific traits.

Another limitation to this study was limited data. The Shawnee Mission School District began collecting AppliTrack pre-screening data in January of 2010. Research shows that 13-15% of teachers leave in the first 3 years of their time in the profession (Ingersoll, 2001); thus, data from additional years would have helped substantiate and validate results. Another limitation is that pre-screening data was only obtained from one school district. AppliTrack data from additional districts may have provided greater statistically valid results. Finally, no

concrete cognitive abilities were measured or obtained. Incorporating cognitive data as an additional predictor would have helped provide a greater range of results.

It is also worth noting that the validity of teacher pre-screeners and their results have recently been called in to question, including specific allegations against Frontline's AppliTrack pre-screener. In November 2011, Chicago teachers filed a complaint with the Illinois Educational Labor Relations Board alleging that five of the 31 pre-screener questions in the AppliTrack pre-screener constituted illegal intimidation and interference. To teacher organizations and union leaders, the test was seen as "a violation of labor law and a disservice to teachers and students" (Lydersen, 2011). Interestingly, in October 2015 the Shawnee Mission School District made the decision to discontinue its use of the AppliTrack pre-screening instrument for screening potential teachers. The district will continue to use the AppliTrack hiring and data storage programs.

5.5 Summary

Results of this study were consistent with current trends in education research: work-related characteristics and skills matter. As is true for most professions, measurable strengths in non-cognitive, work-related characteristics and skills will help applicant's get and keep a job. This is particularly true in education, where the work-related characteristics and skills of a teacher are inextricably tied to teacher effectiveness and student achievement. Thus, the results of this study, while interesting, were essentially common sense. An applicant who has measurable strengths in fairness and organization is more likely to be hired than someone who does not. Similarly, a teacher who has measurable communication and persuasion skills and a strong understanding of cultural competency is more likely to retain their position over a teacher

who does not. It may come as a surprise to some that for the first time in the history of public schools, non-Hispanic, white students are no longer the majority in U.S. public schools (Hussar, 2014). Having an understanding of the important role diversity plays in society is essential to any profession, perhaps none more so than a classroom teacher. In the end, this study shows that while an applicant's work-related characteristics and skills are not the only factors taken into consideration during the hiring process, they do matter.

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Appendix A

Candidate Summary Form

Candidate Summary Report

Candidate: [redacted] **ID:** [redacted]
Date Tested:

Score Summaries

Job Requirement	Score Level	Graph
Fairness and Respect	High	8
Concern for Student Learning	High	9
Adaptability	High	7
Communication and Persuasion	High	9
Planning and Organizing	Average	6
Cultural Competence	High	7
Overall	High	8

Description of Scores

Dimension Definition and Score Interpretation	Score
Fairness and Respect: Ensures that fairness is central to all interactions. Acts with integrity and keeps own word. Recognizes that treating others "fairly" does not always mean "equally" (takes individual circumstances into account). Believes that others matter and deserve respect. Respects and values differences among people, including cultural differences.	**8**
Score Interpretation: Scores in this range mean that the individual places great value on treating others fairly and with respect. The individual believes that others (students; other teachers, parents) have ideas and opinions that should be understood and respected. He or she approaches others with honesty and integrity, and respects and enjoys the ways people are different. The individual scored within the top 25% in this area.	

Dimension Definition and Score Interpretation	Score
Concern for Student Learning: Likes students and enjoys interacting with them and teaching them. Receives satisfaction from seeing students learn and provides them with positive feedback when they do well. Considers each student individually in developing learning plans. Seeks to motivate students to set and achieve high standards.	**9**
Score Interpretation: Scores in range indicate that the individual derives great personal satisfaction from interacting with and teaching students and seeing them learn. When developing learning plans, the individual considers each student individually. He or she is very effective at providing feedback to students who perform well and encouraging these students to set and achieve high standards. The individual also demonstrates concern for underperforming students and strives to engage and motivate them in the classroom. He or she scored within the top 25% of this dimension.	

Appendix B

Interviewer Report

Interviewer Report

Candidate: [redacted] **ID:** [redacted]
Date Tested: [redacted]

Job Requirement	Score Level
Fairness and Respect	High
Concern for Student Learning	High
Adaptability	High
Communication and Persuasion	High
Planning and Organizing	Average
Cultural Competence	High
Overall	High

Fairness and Respect

1. Students sometimes complain that the teacher is not fair. How would you interpret and respond to such a complaint? **Strong response:** Teacher understands the varying needs of students. Primarily, students want to know that they are heard and valued as individuals.
2. In your opinion, which is more important, treating all students equally or considering students' special needs? Why? **Strong response:** Realizes that it is necessary to teach multiple learning styles, but to also treat all students fairly. Teaching a student in a different way which meets the student's needs does not mean that they are not being fair to other students. Meeting the needs of students is ultimate fairness.

Concern for Student Learning

1. In your opinion, should teachers incorporate humor into the classroom? Why or why not? What is the value of using humor? Do you think it would be distracting to students? **Strong response:** Realizes the humor can be engaging in the classroom at appropriate times. The use of humor is connected to better teaching and learning, which is its primary purpose.
2. What do you enjoy most about the teaching profession? Give an example of this aspect of teaching that you enjoy. **Strong response:** Displays a genuine enjoyment of helping students learn and grow. Is able to describe an example of when his/her teaching has helped a student and resulted in personal satisfaction.

Adaptability

1. Describe a time when you were faced with a stressful situation. What was the situation and what did you do to cope? **Strong response:** Explains the effective techniques for dealing with stressful situations, putting things in perspective, resoving the situation rather than ignoring it, etc.
2. In your opinion, in what ways should creativity be used in your role as a teacher? Why? **Strong response:** Discusses the value of creativity in the classroom to explain concepts in new ways, hold students' interest, develop interesting lectures and group activities, etc.

Communication and Persuasion

1. Tell me about one of the best presentations you ever made. What made it so good? What was the reaction from the audience? **Strong response:** Discusses the content of th the presentation (e.g., fun, interesting) as well as presentation skills such as making eye contact, speaking clearly in an appropriate tone, not reading from presentation slides, etc. Recalls positive feedback from the audience.

Appendix C

Sample AppliTrack Questions

Multiple Choice:

1. You have a reputation as an effective teacher. As a result, the principal has recently assigned several students to your class who have had difficulties with behavior in other classrooms. You now feel that the addition of these students has created a much larger workload and that the children are also disruptive. Indicate how likely it is that you would take the following actions:
    a) Incorporate the students as best you can into your classroom this year, but refuse to take any transfers in the future.
    b) Request additional help from the principal in managing these students' behavior.
    c) Request that some of the children be moved to a different classroom.
    d) Do your best to manage the students' behavior on your own and say nothing to anyone.

2. How do you feel about a job that would require you to regularly work after hours?
    a) Very inconvenient, would refuse such a job
    b) Inconvenient
    c) Somewhat inconvenient
    d) Not inconvenient
    e) Would prefer such a job

3. How long do you persist on problems when you feel lost or confused?
    a) Very long period of time
    b) Long period of time
    c) About average period of time
    d) Short period of time
    e) Very short period of time

4. In the past year, how often have you taken charge of a group that you were in without being asked?
    a) Never
    b) Once or twice
    c) Between three and five times
    d) Between six and ten times
    e) More than ten times

5. How often have you accomplished something you thought was very difficult or almost impossible?
    a) Very often
    b) Often
    c) Sometimes
    d) Rarely
    e) Never

6. In the last three years, how many clubs or groups (e.g., social organizations, sports teams, academic clubs, or civic groups) did you actively participate in and make a positive difference?
   a) None
   b) 1-2
   c) 3-5
   d) 6-10
   e) More than 10

7. You are working on something that must be completed by the end of the day in addition to teaching your last class. Late in the afternoon another teacher asks you for some information related to her own work. She has a reputation for frequently and unnecessarily asking for help. Indicate how likely it is that you would take one of the following actions:

   • Suggest she call the principal's office for help.
      - Extremely Likely
      - Very Likely
      - Likely
      - Neither Likely nor Unlikely
      - Unlikely
      - Very Unlikely
      - Extremely Unlikely

   • Take some time out at the end of the day to help her.
      - Extremely Likely
      - Very Likely
      - Likely
      - Neither Likely nor Unlikely
      - Unlikely
      - Very Unlikely
      - Extremely Unlikely

   • Ask the principal to provide the help she needs.
      - Extremely Likely
      - Very Likely
      - Likely
      - Neither Likely nor Unlikely
      - Unlikely
      - Very Unlikely
      - Extremely Unlikely

- Explain that you don't have time to help her.
    - Extremely Likely
    - Very Likely
    - Likely
    - Neither Likely nor Unlikely
    - Unlikely
    - Very Unlikely
    - Extremely Unlikely

- Tell her you don't have time right now, but you will contact her tomorrow.
    - Extremely Likely
    - Very Likely
    - Likely
    - Neither Likely nor Unlikely
    - Unlikely
    - Very Unlikely
    - Extremely Unlikely

8. It is important that you admit your mistakes to students when those mistakes affect them.
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

9. You can't really motivate people; they're interested or they're not.
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

10. I rarely act without planning.
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

11. I am always prepared.
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

12. I'm told that I have a way of making things interesting.
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

13. Teachers must monitor what types of activities facilitate the learning of different students.
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

14. I am often placed in organizing roles.
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

15. In teaching, being spontaneous is more important than planning.
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

16. An important part of a teacher's job is helping students seek out new ideas.
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

17. Some students are simply not able to meet all learning objectives.
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

18. I often jump into things without thinking.
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

19. Using different teaching styles with different students may mean you have to lower your standards for their performance.
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

20. Once you take a position with students, you should stick with it, even if you're wrong.
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

21. I have a knack for understanding people who think differently than I do.
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

22. There's probably some truth in the saying that "teaching would be fun if it weren't for the students."
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

23. It may be good or bad, but I'm just not very diplomatic.
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

24. The first thing to do when a student fails to do his or her homework is call his/her parents.
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

25. Parents are not usually objective when it comes to their children, so it is often necessary for the teacher to "hit them with the facts."
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

26. A student's cultural background affects how he/she perceives teachers.
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

27. I would not hesitate to ask other teachers about a student's cultural background.
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

28. It is important to recognize that a student's cultural background may influence his/her ability to learn.
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

29. Teachers should talk with each other about how students' cultural backgrounds impact their behavior.
    - Strongly Disagree
    - Disagree
    - Neither Agree nor Disagree
    - Agree
    - Strongly Agree

Short Answer:

30. If a student wants to change teachers because they don't like your teaching style, what would you do?

31. If your building principal has some ideas for change but some teachers don't like the ideas, what would you do?

32. If you overhear a teacher speaking negatively about a student, what would you do?

33. What would you do if some of your students are critical of your teaching?

34. If your building principal wants to change your placement but you like your placement, what would you do?

35. If your building principal disapproves of the way you are disciplining a student, what would you do?

Essay Questions:

36. What are your three most important reasons for wanting to become a teacher?

37. How much do you want to know about your students in order to be most helpful to them?

38. What three things do you most want to know about your students?

39. What do you need to know in order to begin your lesson planning for a class?

40. What four key components to you believe you must include in your lesson plan?

41. When you think about your students, in what major ways do you most want to influence their lives?

42. What two core teaching strategies do you most use to achieve this result?

43. Describe how you would use technology to improve your effectiveness as an educator.

44. Describe how you would incorporate technology into your lessons.

45. List any additional information that will help in determining your professional qualifications for a teaching position.

Appendix D

SAS Model Information

Model 1:

The SAS System 13:59 Monday, January 9, 2017

The PHREG Procedure

Model Information

Data Set	JMPROJ.BASE_DATA3
Dependent Variable	dur2
Censoring Variable	leave
Censoring Value(s)	0
Ties Handling	EFRON

Number of Observations Read	414
Number of Observations Used	411

Summary of the Number of Event and Censored Values

Total	Event	Censored	Percent Censored
411	77	334	81.27

Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	840.900	821.529
AIC	840.900	841.529
SBC	840.900	864.967

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	19.3710	10	0.0358
Score	19.5896	10	0.0334
Wald	19.1884	10	0.0379

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Parameter	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio
month_accept	1	0.02663	0.01085	6.0210	0.0141	1.027
adapt	1	0.06656	0.12043	0.3054	0.5805	1.069
comm_pers	1	0.13550	0.12349	1.2040	0.2725	1.145
concern_lrn	1	-0.08116	0.11830	0.4707	0.4927	0.922
cultural	1	-0.13470	0.05710	5.5657	0.0183	0.874
fairness	1	0.07875	0.09289	0.7188	0.3965	1.082
plan	1	-0.09752	0.07796	1.5650	0.2109	0.907
male	1	-0.33172	0.34077	0.9476	0.3303	0.718
elem	1	0.20387	0.23932	0.7257	0.3943	1.226
grad_deg	1	-0.29252	0.23900	1.4980	0.2210	0.746

Model 2:

The PHREG Procedure

Model Information

Data Set	WORK.TEMP
Dependent Variable	dur2
Censoring Variable	LEAVE_X
Censoring Value(s)	0
Ties Handling	EFRON

Number of Observations Read	414
Number of Observations Used	411

Summary of the Number of Event and Censored Values

Total	Event	Censored	Percent Censored
411	74	337	82.00

Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	806.556	786.420
AIC	806.556	806.420
SBC	806.556	829.461

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	20.1364	10	0.0280
Score	20.2357	10	0.0271
Wald	19.8204	10	0.0310

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Parameter	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio
month_accept	1	0.02665	0.01117	5.6901	0.0171	1.027
adapt	1	0.01757	0.12266	0.0205	0.8861	1.018
comm_pers	1	0.19601	0.12889	2.3127	0.1283	1.217
concern_lrn	1	-0.06128	0.12111	0.2560	0.6129	0.941
cultural	1	-0.12596	0.05807	4.7041	0.0301	0.882
fairness	1	0.09434	0.09605	0.9646	0.3260	1.099
plan	1	-0.10767	0.07969	1.8252	0.1767	0.898
male	1	-0.39274	0.35479	1.2254	0.2683	0.675
elem	1	0.24055	0.24387	0.9730	0.3239	1.272
grad_deg	1	-0.30877	0.24313	1.6129	0.2041	0.734

Model 3:

The PHREG Procedure

Model Information

Data Set	WORK.TEMP
Dependent Variable	dur2
Censoring Variable	LEAVE_X
Censoring Value(s)	0
Ties Handling	EFRON

Number of Observations Read	414
Number of Observations Used	411

Summary of the Number of Event and Censored Values

Total	Event	Censored	Percent Censored
411	5	406	98.78

Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	57.781	42.292
AIC	57.781	62.292
SBC	57.781	58.387

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	15.4891	10	0.1152
Score	16.1511	10	0.0954
Wald	11.9686	10	0.2872

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Parameter	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio
month_accept	1	0.06285	0.04390	2.0503	0.1522	1.065
adapt	1	1.17805	0.55554	4.4968	0.0340	3.248
comm_pers	1	-0.89806	0.39966	5.0493	0.0246	0.407
concern_lrn	1	-0.54911	0.52415	1.0975	0.2948	0.577
cultural	1	-0.32269	0.30244	1.1384	0.2860	0.724
fairness	1	-0.11845	0.33441	0.1255	0.7232	0.888
plan	1	-0.29481	0.30641	0.9257	0.3360	0.745
male	1	-0.99699	1.33036	0.5616	0.4536	0.369
elem	1	0.90173	1.09920	0.6730	0.4120	2.464
grad_deg	1	-0.56497	1.09854	0.2645	0.6070	0.568

Model 4:

The PHREG Procedure

Model Information

Data Set	WORK.TEMP
Dependent Variable	dur2
Censoring Variable	LEAVE_X
Censoring Value(s)	0
Ties Handling	EFRON

Number of Observations Read	414
Number of Observations Used	413

Summary of the Number of Event and Censored Values

Total	Event	Censored	Percent Censored
413	5	408	98.79

Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	57.812	54.660
AIC	57.812	64.660
SBC	57.812	62.707

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	3.1521	5	0.6766
Score	2.8628	5	0.7211
Wald	2.5938	5	0.7623

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Parameter	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio
month_accept	1	0.06626	0.04547	2.1233	0.1451	1.069
adapt	1	0.00866	0.28631	0.0009	0.9759	1.009
male	1	0.02171	1.14874	0.0004	0.9849	1.022
elem	1	0.56801	0.93952	0.3655	0.5455	1.765
grad_deg	1	0.13822	0.92069	0.0225	0.8807	1.148

Model 5:

The PHREG Procedure

Model Information

Data Set	WORK.TEMP
Dependent Variable	dur2
Censoring Variable	LEAVE_X
Censoring Value(s)	0
Ties Handling	EFRON

Number of Observations Read	414
Number of Observations Used	413

Summary of the Number of Event and Censored Values

Total	Event	Censored	Percent Censored
413	5	408	98.79

Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	57.812	50.575
AIC	57.812	60.575
SBC	57.812	58.622

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	7.2368	5	0.2036
Score	8.0462	5	0.1537
Wald	7.1881	5	0.2070

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Parameter	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio
month_accept	1	0.06279	0.04455	1.9864	0.1587	1.065
comm_pers	1	-0.57378	0.28169	4.1491	0.0417	0.563
male	1	-0.20380	1.15695	0.0310	0.8602	0.816
elem	1	0.38798	0.96010	0.1633	0.6861	1.474
grad_deg	1	-0.16135	0.96005	0.0282	0.8665	0.851

Model 6:

The PHREG Procedure

Model Information

Data Set	WORK.TEMP
Dependent Variable	dur2
Censoring Variable	LEAVE_X
Censoring Value(s)	0
Ties Handling	EFRON

Number of Observations Read	414
Number of Observations Used	413

Summary of the Number of Event and Censored Values

Total	Event	Censored	Percent Censored
413	5	408	98.79

Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Without Covariates	With Covariates
-2 LOG L	57.812	46.553
AIC	57.812	58.553
SBC	57.812	56.210

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	11.2584	6	0.0807
Score	12.0051	6	0.0619
Wald	9.7407	6	0.1360

The PHREG Procedure

Analysis of Maximum Likelihood Estimates

Parameter	DF	Parameter Estimate	Standard Error	Chi-Square	Pr > ChiSq	Hazard Ratio
month_accept	1	0.07528	0.04455	2.8558	0.0910	1.078
adapt	1	0.84081	0.46742	3.2357	0.0720	2.318
comm_pers	1	-1.14077	0.40957	7.7579	0.0053	0.320
male	1	-0.07146	1.15731	0.0038	0.9508	0.931
elem	1	0.68609	0.99596	0.4745	0.4909	1.986
grad_deg	1	-0.11430	0.99619	0.0132	0.9086	0.892